Small Intestine Intussusception Due to Lung Cancer Metastasis - A Case Report and Literature Review

Kuen-Jang Tsai¹, En-Kuei Tang², Pei-Min Hsieh³

Case Report

Adult intussusceptions are usually caused by definable structural lesions. Cases of lung cancer with metastasis to the small intestine causing intussusception are very rare. We herein report a case of undiagnosed lung cancer presenting with symptoms of abdominal pain and poor appetite. Despite the absence of history of previous abdominal operation, abdominal radiograph revealed small intestinal obstruction. Computed tomography (CT) demonstrated intussusception of the small bowel. Pre-operative chest radiograph revealed a round opacity about 5 cm in diameter in the right upper lobe. At laparotomy, intussusception due to an ileal tumor located approximately 60 cm from the ileocecal valve was noted. Partial small bowel resection was performed. CT-guided lung biopsy conducted after abdominal surgery confirmed the diagnosis of lung cancer that had metastasized to the small intestine, causing intussusception. Despite adjuvant chemotherapy and targeted therapy, the patient eventually died of cancer progression one year after surgery. Relevant literature was retrieved from the PubMed database from 2006 to 2015 using the keywords “adult intussusception,” “lung cancer,” and “metastasis.” There are sixteen cases including our patient. We reviewed the clinical manifestations, image findings, optimal treatment, and prognosis.

Key words: intussusception, lung cancer, metastasis

Introduction

Lung cancer is the deadliest cancer worldwide and the most common cancer in Asia.¹ Lung cancer metastasis is commonly seen in the adrenal glands, brain, liver, and bone.² Metastasis of lung cancer to the gastrointestinal tract is rare and thought to confer an extremely poor prognosis.³ The three
most common clinical presentations of lung cancer metastasis in the intestine are intestinal perforation, obstruction, and bleeding.

Intussusception is primarily seen in children between three months and three years of age, and adult patients account for only 5% of all cases. In contrast to pediatric patients with intussusception who usually present with acute intestinal obstruction, the clinical manifestations in adults are usually chronic and suggestive of partial intestinal obstruction such as colicky abdominal pain, distension, nausea, and vomiting. Most adult intussusceptions are caused by definable structure lesions. We present a case of adult intussusception caused by lung cancer metastasis. The pulmonary and intestinal lesions were found simultaneously. The etiology, diagnosis, treatment, and prognosis of this disease are discussed along with a brief review of the literature in this report.

**Case Report**

A 45-year-old man visited a district hospital complaining of intermittent abdominal cramping pain for two months. Poor appetite and abdominal distension were also noted without subjective body weight loss during that period. The patient’s past history was unremarkable with the exception of smoking for more than 20 years and approximately a packet of cigarettes per day. He was afebrile on arrival at the outpatient clinic with mild dehydration and a fair nutritional status. Physical examination showed a soft, mildly distended abdomen. Bowel sound was present but hypoactive. There was no palpable mass on abdominal palpation. Laboratory study revealed an elevated white blood cell count of 13570/μL and C-reactive protein concentration of 60.98 mg/L. The results of all other blood, urine, and stool tests were all within normal limits. No respiratory symptoms such as cough, hemoptyysis, or dyspnea were evident on admission.

Chest radiograph showed a round opacity about 5 cm in diameter in the right upper lobe. Plain abdominal film showed mildly dilated small intestine. Abdominal contrast-enhanced computed tomography (CT) scan demonstrated segmental distension of ileum with mural thickening and a “bowel within bowel” lesion in the right lower quadrant of the peritoneal cavity and a round mass adherent to the left upper abdominal wall (Fig. 1).

Exploratory laparotomy performed under the diagnosis of organic small bowel obstruction revealed ileal intussusception 60 cm proximal to the ileocecal valve without signs of bowel ischemia (Fig. 2A). Moderate amount of clear ascites was noted without evidence of peritoneal carcinomatosis or gross mesenteric lymph node enlargement. Partial resection of the small intestine with end-to-end anastomosis was performed. A polypoid mass of size 5.6 × 4.4 × 2.5 cm³ was found in the distal ileum in the intussuscepted segment (Fig. 2B). The mass adherent to the abdominal wall was also resected.

**Fig. 1** Coronal section of abdominal computed tomographic scan showing a “bowel-within-bowel” lesion in the right lower quadrant of the peritoneal cavity (arrow) and a round mass that adhered to the left upper abdominal wall (arrow head).
Pathological examination of the small intestinal mass revealed poorly differentiated carcinoma extending from the submucosa to subserosa with pleomorphic nuclei, prominent nucleoli, and eosinophilic cytoplasm (Fig. 3A & B). In addition, one of six mesenteric lymph nodes showed infiltration of neoplastic epithelial cells. Microscopic finding of vascular tumor thrombi in the lesion also supported the possibility of metastasis (Fig. 3C). Immunohistochemical staining demonstrated tumor cells that were positive for cytokeratin 7 (CK7), high molecular weight cytokeratin (HMW-CK, clone 34 beta E12), and p63, but cells were negative for cytokeratin 20 (CK20) and thyroid transcription factor-1 (TTF-1) (Fig. 4). The findings were consistent with TTF-1-negative subgroup of lung cancer that had metastasized to the small intestine. The microscopic appearance of the abdominal wall mass was the same as that of the small intestinal lesion.

The patient’s postoperative recovery was uneventful. CT-guided percutaneous biopsy of the lung tumor performed two weeks after the operation showed non-small cell carcinoma with histopathological features identical to those of the small intestinal lesion on immunohistochemical staining (Fig. 3D). The final diagnosis was primary lung cancer with metastasis to the small intestine. A subsequent positron emission tomography (PET) scan revealed fluorodeoxyglucose (FDG)-avid spots in the right upper lobe of the lung, right upper paratracheal lymph node, left sixth rib, thyroid, and right thigh muscle.

Postoperatively, chemotherapy was started with docetaxel, followed by gemcitabine, and targeted therapy with gefitinib. Three months after surgery, the patient presented with symptoms of increased intracranial pressure. Brain CT scan demonstrated brain metastases for which whole brain irradiation combined with focal boost with a total dose of 45.5 Gy was delivered. Unfortunately, the patient experienced obstructive pneumonitis that led to respiratory failure to which he succumbed one year after abdominal surgery.

**Discussion**

Metastasis in the small intestine is uncommon and is usually seen in malignant melanoma, and carcinomas of the breast, colon, lung, and kidney. Considering the 100% mortality rate of patients with lung cancer metastasis to the small intestine as reflected in the outcome of the present case and in relevant literature, the condition appears terminal.

In addition to our case, the 15 case reports retrieved from the PubMed database included
four from Europe, one from the USA, and ten from the Asia-Pacific region. There was a strong male predominance (n = 15, 93.8%). The average age of these patients was 67.7 ± 11.4 years (45–88). The predominant manifestations were abdominal pain (75.0% of the patients), vomiting (56.3%), abdominal distension (37.5%), and black stool (25.0%), while rare presentations including constipation (12.5%) and palpable abdominal mass (6.3%) have also been reported. These clinical manifestations of adult intussusception are quite different from those of pediatric patients. Abdominal CT scans were performed in all sixteen cases. The most common CT finding was a target mass (12/16), followed by small bowel dilatation (2/16), mesenteric mass (1/16), and pancreatic mass (1/16). The two most common locations of alimentary metastasis were ileum (8/16, 50.0%) and jejunum (6/16, 37.5%), followed by duodenum (1/16, 6.3%), pancreas (1/16, 6.3%), and cecum (1/16, 6.3%). The lesions were mostly single (9/16, 56.3%). On the other hand, multiple intestinal lesions were noted in 7 cases, one of which was reported to lead to recurrent intussusception after the first resection 44 days after the first surgery. One case of simultaneous jejunal–jejunal and colonic–colonic intussusceptions and another one of two concurrent small intestinal intussusceptions were reported. All patients received segmental resection and primary anastomosis.

Fig. 3 (A) Pathological examination of the small intestinal mass under low magnification (20×) showing poorly differentiated carcinoma extending from the submucosa to subserosa. (B) High magnification (200×) demonstrating pleomorphic nuclei, prominent nucleoli, and eosinophilic cytoplasm. (C) The presence of cancer cell thrombi in vascular channels suggestive of metastasis (arrow) (100×). (D) Lung biopsy revealing non-small cell carcinoma with histopathological features identical to those of the small intestinal lesion, implicating the pulmonary origin of the intestinal lesion (100×).
and one of them underwent Whipple’s procedure because of upper gastrointestinal bleeding from the metastatic duodenal lesion.\textsuperscript{8} The mean postoperative survival time was \(5 \pm 3.3\) months. The causes of death were cancer progression (3/16, 18.8%), pneumonia (n = 2, 12.5%), and sepsis (n = 2, 12.5%). Chemotherapy was reported in five cases, including platinum antineoplastic chemotherapy (n = 2, 40%), gemcitabine (n = 2, 40%), taxotere (n = 1, 20%) and tegafur/uracil (n = 1, 20%). Two patients received targeted therapy with gefitinib (n = 2, 40%). However, no significant difference was noted in the duration of mean postoperative survival between patients who received chemotherapy (5.25 \(\pm\) 3.11 months) and those who did not (3.6 \(\pm\) 2.8 months) \((p = 0.24)\). Regarding the locations of the primary lung lesion, 7 and 6 lesions were in the right and left lungs, respectively. The mean size of the intestinal mass was 4.42 \(\pm\) 1.24 cm according to the available information with the predominant pathology being pleomorphic carcinoma (n = 7, 43.8%), adenocarcinoma (n = 3, 18.8%), large cell carcinoma (n = 3, 18.8%), adenocarcinoma (n = 2, 12.5%), adenosquamous cell carcinoma (n = 2, 12.5%), and small cell carcinoma (n = 1, 6.3%). In terms of the characteristics on immunohistochemical staining, five specimens were CK7- positive, whereas all five were negative for CK20 staining. Of these five specimens, two were positive and the other two were negative for TTF-1 staining.

Histopathologic study, especially immunohistochemical staining, is the key method for identifying the origin of metastasis. This is of great importance for the selection of adjuvant therapy after surgery. Despite the extremely poor prognosis of these patients, most researchers agree that surgical treatment is required as long as the patient’s physical condition can tolerate the procedure. On the other hand, literature review showed no survival benefit for patients receiving adjuvant chemotherapy, radiotherapy, or targeted therapy.

In histopathological study, the patient’s intestinal lesion showed poorly differentiated carcinoma. Immunohistochemical staining was positive for CK7 and HMW-CK, and negative for CK20 and TTF-1, suggesting its metastatic nature from primary lung carcinoma. A study demonstrated that 73% of the
Due to the limited number of cases in this review, the most appropriate adjuvant therapy after surgery could not be established.

Limitations

Due to the limited number of cases in this review, the most appropriate adjuvant therapy after surgery could not be established.

Disclosure Statement

The authors declare no conflicts of interest.

References